N. A. C. A. BULLETIN

Section I

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Cost Accounting for Paper Mills

By

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SEPTEMBER 15, 1926

Editorial Department Note

One of the major purposes of the National Association of Cost Accountants is the presentation of cost accounting methods and procedures actually in use in industry. While realizing fully the importance of a scientifically developed body of principles and lending its influence in that direction at every opportunity, the Association has endeavored to make significant contribution to the field of cost accounting by presenting from time to time descriptions and explanations of systems of accounting as actually operated. As exemplifying the application of principles and showing their adaptations to the conditions peculiar to each case, such publications provide excellent cost material and are always replete with suggestion for the handling of similar situations wherever encountered.

Charles W. Gould, Jr., the author of this publication, was graduated from Commercial High School, Brooklyn, New York, in 1907 and attended New York University School of Commerce, Accounts and Finance for almost two and one-half years. During the latter part of 1909 he entered the employ of the Prudential Insurance Company, at their home office in Newark, New Jersey, serving his clerical apprenticeship in the mailing, actuarial, bookkeeping and statistical departments. In 1916 he left the Prudential to become Secretary of the Bottum & Torrance Company of Bennington, Vermont, manufacturers of men's high-grade half-hose. He remained with this company up until the time he entered the service in the latter part of 1917. After having served with the United States Marines in France, he entered the employ of the Great Atlantic and Pacific Tea Company as Warehouse Manager. However, it took but a short time to realize that warehousing would have to go it alone as far as he was concerned.

His present connection as Cost Accountant for the L. L. Brown Paper Company of Adams, Massachusetts, dates from March 1, 1920. The L. L. Brown Paper Company have been manufacturers of the highest grade of ledger, linen and bond papers for over three-quarters of a century.

Mr. Gould is a member of the National Association of Cost Accountants, Springfield Chapter. He has been engaged by the "Paper Industry," a trade paper, to write a series of six articles on Cost Accounting for Paper Mills.

COST ACCOUNTING FOR PAPER MILLS

Every cost accounting system must be particularly adapted to the business in which it is to be used. Organizations differ in many ways; the nature of the business conducted, the form of the organization, and the methods of direction are varied and dissimilar. Certain definite information is required from every accounting system, and this information and the method in which it is compiled, differ materially in different organizations. Two questions, then, present themselves, namely, what particular information is desired, and what is the best way to secure it.

That part of the problem with which we are chiefly concerned lies in the selection of the various ways of collecting and summarizing this information. Assembling figures by machinery may

be awkward and costly, or it may be exactly the method necessary to economical operation. Experience and imagination coupled with the power of adaptation play an all important part in the solution of this problem.

From the standpoint of clearness in presentation, it is best in this paper to treat separately the questions involved. Accordingly, the first part will concern itself with the development of the structure of a modern cost system, while the second will be devoted to a consideration of a procedure to summarize the information gathered.

PART I—DEVELOPMENT OF DEPARTMENTAL BURDEN

In calculating the cost of our product, it is relatively a simple problem to determine the elements of material and labor costs for each lot. It is in the proper distribution and application of the burden charges to the cost of the product that the more serious difficulties are encountered, and yet burden is a very important factor of cost.

All items of expense are allocated as nearly as possible directly to the product for which such items of expense are made. Since practically all of these expenses are incurred by or for certain operations or departments, rather than for any part of the product, it follows that these items of expense should be charged directly, or at least distributed to these operations or departments according to the benefits they receive from such expenditures. The total expenses of these departments are then applied to the product on a basis which accurately measures the expense earned or absorbed by the product as it passes through the successive operations or processes.

To that end we have divided our mills into departments or centers, in accordance with the operations or processes performed. For each of these centers a total annual burden is determined which consists of some or all of the following factors:

1. Fixed Charges. (Taxes, Insurance, and Depreciation)
2. Indirect Labor.
3. Supplies and Expense.
4. Liability Insurance.
5. General Mill Burden.
6. Steam.
7. Electric Power.
8. Water Supply.
9. Repairs.

Having distributed these charges to the individual centers, we are able to calculate a machine-hour, man-hour, or process rate for each producing center or operation, this rate being the medium through which the burden is charged to the cost of the product.

Plant Accounts

Accountants and engineers alike experience considerable difficulty when trying to analyze the books of the average manufacturing plant for auditing or appraisal purposes. Usually there

is a large discrepancy between the plant assets as shown by an inventory count and the assets as they appear on the books. In a large number of cases, this is due to the fact that a conglomeration of charges appears on the books as assets when as a matter of fact no such total of assets can be found by a close investigation.

Much of the difficulty that surrounds this matter will be dissipated if the organization provides a plant ledger, wherein each article or unit of equipment is recorded separately, showing the original cost and the amount of depreciation provided annually. In many progressive concerns the use of such a ledger is almost an absolute necessity if anything resembling accuracy is desired in the plant and cost accounts. A well defined system of classification of accounts, therefore, is seen to play a large part in the success of any cost accounting system.

Our various plant charges are entered in separate ledger accounts, rather than grouped under one account, and are designated as follows:

1. C-2 Land.
2. C-3 Buildings.
3. C-4 Building Fixtures.
4. C-5 Machinery and Equipment.
5. C-6 Small Tools.
6. C-7 Furniture and Fixtures —Mill.
7. C-8 Furniture and Fixtures —Office.
8. C-9 Trucks and Automobiles.

A plant ledger card is maintained for each item of equipment, (See Exhibit 1) and the ledger is so arranged as to show

Name of Machine Toledo Springless Automatic Scale — MFG's No. 931-4-5M — Our No. 1162
Mak. 4 Toledo Scale Company — Bought of Toledo Scale Company
Purch. Order No. 42671 — Date 2-16-21 — Ordered by H.R. — Purpose Rough Paper Scales
Date Received 3-14-1921 — Invoice Date 3-18-1921 — Invoice No. 3-31 — Account Charged C-5
Price 140.00 — Terms NC — F.O.B. Toledo — Total Amt. 140.00 — Disc. — — Frt. 5.49 — Net Cost 145.49
Location — Building No. L.M.2-3 — Center Name Rough Paper Storage — Number 18
Description and Remarks

DATE	ITEMS	DEBITS	CREDITS	BALANCE
3/18	1-931-4-5M Toledo Springless Automatic Scale	140 00		
	Freight Charges from F-S	5 49		145 49

PLANT LEDGER

EXHIBIT 1

plant values by classes of assets, sub-divided by departments or centers and further sub-divided by classes of equipment.

The following condensed classification will serve to show the various classes of equipment used:

	Code No.	*Class of Equipment*
1.	3-000-00	Mill Buildings.
2.	4-038-00	Building Fixtures.
3.	5-035-01	Dams, Wells & Reservoirs.
4.	5-038-02	Underground Piping.
5.	5-030-03	Railroad Tracks and Trestles.
6.	5-038-05	Miscellaneous Paper Mill Machinery.
7.	5-025-06	Pumps and Engines.
8.	5-032-07	Machine Tools.
9.	5-025-08	Steam Plant & Steam Transmission Equipment.
10.	5-126-09	Motors and Electrical Equipment.
11.	5-005-10	Brick Drainers.
12.	5-022-11	Tubs, Tanks and Vats.
13.	5-007-12	Shafting and Pulleys.
14.	5-026-13	Electric Wiring.
15.	5-106-14	Manufacturing Pipe.
16.	5-009-15	Trucks and Scales.
17.	5-116-06	Benches, Tables and Racks.
18.	5-001-17	Miscellaneous Equipment.
19.	6-000-01	Small Tools.
20.	7-037-01	Office Furniture & Fixtures.
21.	9-034-01	Trucks and Automobiles.

To each department or center is assigned a specific number by which it is always known. Under this method the charge for a pump purchased for the Water Supply department would be classified 5-035-06, in which 5 would be the account number, 035 the department for which the pump was purchased, and 06 the class of equipment.

The flexibility of the plant ledger permits departmental transfers. When machinery or other equipment is transferred from one department to another, both the value of the asset and the total depreciation to date are likewise transferred.

The reverse side of the plant ledger card is so designed as to provide space for recording the depreciation, both for the current year and the accumulated amount to date. All accounts represented in this ledger are balanced and in proof with the controlling accounts in the general ledger.

The complete development of burden is made with the aid of three kinds of statements which we call Appendices, Exhibits, and Schedules.

In the development of burden it has frequently been necessary to make preliminary calculations, these are shown in detail on the Appendices.

On the Exhibits are assembled the total burden charges for each individual center.

After all the factors which make up the burden of each center are entered on the Exhibits, they are summarized on Schedules.

Fixed Charges

Recapitulation of Plant Values. On this Appendix are assembled the values of the various classes of fixed assets and average inventories. The total of these items represents the amount of capital invested for manufacturing purposes. These values are used as the basis of all fixed charges, such as Taxes, Insurance, Depreciation, and Building Repairs. Building repairs are considered as a fixed charge and reflects a percentage of the building values. The amount thus reserved is sufficient to provide for major repairs, and in this way the cost of such repairs is spread over a considerable period.

Determination of Tax Rate. The amount of taxes, both local and state, assessed on our plant is expressed as a percentage of plant values. The total estimated tax for the current year divided by the total plant values furnishes a rate which is used in determining the distribution of this charge.

Determination of Insurance Rate. Insurance is carried on the full value of all property. The charge for general insurance is found by dividing the net amount of all fire-insurance premiums by the plant values, less the value of land. Thus, the total net premium is expressed as a percentage of plant values, and is also used in determining the distribution of this charge.

Fixed Charges—Land and Buildings. On this Appendix we calculate the total fixed charges on land (taxes and insurance) and buildings (taxes, insurance, depreciation, and building repairs, to which is added the cost of buildings and ground expense. The total charges to building and grounds expense are classified under four headings: Heating, Lighting, Fire Protection, and General, and are distributed to the various buildings on the basis of floor area of those buildings, taking into consideration each particular class of service. The total charge for each building appearing on this Appendix divided by the square foot area of the building provides a rate per square foot.

Distribution of Land and Building Charges. This Appendix shows the floor space of buildings and gives the definite location of each department or center and the area assigned to it. The number of square feet of floor space occupied by each center, the rate and annual charge are shown in detail.

The charges to the individual departments or centers as shown on this Appendix are carried to the Exhibits representing the various centers and listed there (See Exhibit 2).

Fixed Charges, Machinery and Equipment. On this Appendix is recorded the distribution of machinery and equipment to the several centers and also the calculation of the fixed charges

DATE JANUARY 1ST 1926 EXHIBIT NO 106

CENTER NAME BEATERS-UPPER MILL

APPENDIX	NAME				ANNUAL CHARGE
A	Land and Buildings Factor				
	UPPER MILL-MAIN GROUP				
	FIRST FLOOR-1414 SQ.FEET			360.39	
	SECOND FLOOR-4171 SQ.FEET			1063.06	
				1423.45	
B	Equipment Factor (Depreciation)				
	Item No. Kind	Value	Rate	Amount	
	1. MISC.PAPER MILL MACHINERY	9765.92	5	488.30	
	2. PUMPS AND ENGINES	61.74	8	4.94	
	3. SHAFTING AND PULLEYS	1204.26	10	120.43	
	4. MANUFACTURING PIPE	1046.34	10	104.63	
	5. TRUCKS AND SCALES	767.69	15	115.15	
	6. BENCHES TABLES AND RACKS	72.25	10	7.23	
	7.				
	8.				
	9.				
	10. Total	12918.20		840.68	
	10. Interest				
	10. Taxes	12918.20	1.38	178.27	
	10. Insurance	12918.20	.07	9.04	
				187.31	
C	Miscellaneous Fixed Charges			362.50	
D	Total Fixed Charges				2813.94
E	Indirect Labor				8500.00
F	Supplies and Expense				375.00
G	Compensation Insurance				119.43
H	General Mill Burden				1341.42
K	Steam				32.42
L	Trucking				
M	Power (Water and Electric)				11811.27
N	Water				113.46
P	Repairs				600.00
T	Total Estimated Burden				25706.94

Total Estimated Burden $25706.94 = .697345
ESTIMATED ANNUAL MACHINE HOURS 36864

Rate $.70 PER MACHINE HOUR

EXHIBIT 2

(taxes, insurance, and depreciation) on this equipment for each center. The total value of the equipment in each center is first shown in total and then the individual items are distributed accord-

ing to the various classes of equipment, the rate of depreciation varying for each class. The columns at the right of this Appendix show the total taxes, insurance, and depreciation, chargeable to each center.

The charges to the individual centers as shown on this Appendix are carried to the Exhibits.

Fixed Charges—Miscellaneous. On this Appendix are shown those fixed charges which do not apply to the plant as a whole, but which are chargeable to a particular department. The values of the average inventories set up in total on the Recapitulation of Plant Values are here distributed and carrying charges (taxes and insurance) are calculated at the rates developed. Insurance and tax charges applicable to individual centers are also shown on this Appendix.

The amount of miscellaneous fixed charges for each department is carried forward in total to the Exhibits.

Indirect Labor. By indirect labor is meant that labor which is charged as a part of the burden, as distinguished from direct labor which is charged directly to a particular lot. All our labor, with the exception of rag dressing, sheet calendering, and plating, and the labor of sorting and counting, is considered as indirect. This method was adopted since most of the so-called productive labor is so much a part of the machine operation in some cases and very uniform as to distribution over the product passing through a department in others, that more accurate results and greater simplicity are obtained by treating this labor as part of the burden, and applying it to cost as a part of the burden rate.

The figures shown on this Appendix constitute the estimated cost of indirect labor for a normal operating year. The distribution is made by departments and carried to the Exhibits.

Supplies and Miscellaneous Expense. On this Appendix we show the estimated cost of supplies for the various departments for a normal operating year. These amounts do not include any charge for materials used for repair purposes, such materials being treated as part of the cost of repairs.

We also show on this Appendix miscellaneous items of expense, such as grinding rolls and knives. The cost of purchased electric power is also included as an expense under electric power departments. The cost of trucking is treated as expense and is distributed to the centers requiring this service.

The total supply and miscellaneous expense charges are carried to the Exhibits in the same manner as previously described.

Compensation Insurance. This charge is based on the estimated payroll for a normal operating year and the latest premium rates obtainable. The periodical charge is obtained by analyzing the payroll by departments and applying the rate for the class of labor in that center.

Distribution of General Mill Burden. The charges assembled under this heading are those which are not directly applicable to

any particular department, but which apply to the mills as a whole. Examples of such expenses are Cost Department, First Aid, Laboratory, Mill Offices, and Miscellaneous items about the mill. The percentages used in making this distribution are based on the number of employees in each department.

Distribution of Steam Charges. The distribution of steam plant charges is made on the basis of the estimated pounds of steam condensed annually. The distribution is made following experimental tests to determine the steam required by the various departments.

Distribution of Electric Power. The distribution of the electric power charges is based upon the estimated kilowatt hours required by the various centers annually.

Distribution of Water Supply. This Appendix shows the annual charge for water supply and its distribution to the various departments. The number of gallons required yearly by departments using water is estimated and these figures reduced to a percentage of the total.

The charge for Water Supply is carried to the departmental Exhibits.

Repairs to Machinery and Equipment. The annual charge for repairs to machinery and equipment included in each department is based upon estimates, and the total charge carried to the Exhibits.

Departmental Burden

Exhibits. An Exhibit is prepared for each department or center on which is shown by classes of expense the estimated annual charges applying to the center. These Exhibits also show the floor space areas, the various items of equipment, and all items of information pertinent to the respective centers. The amounts of the various charges shown on these Exhibits are derived from the several Appendices mentioned heretofore.

The method used in establishing normal operating capacity in order to constitute a safe basis for computing manufacturing costs and selling prices, is based on past experience and present knowledge coupled with a proper regard for future conditions. The total estimated annual burden in each center, divided by the estimated yearly productive units, furnishes a normal departmental operating rate which is employed in applying the total burden of the several centers to the cost of the product passing through them.

Schedules

The following Schedules present, in tabular form, a complete resumé of the development of burden:

1. Summary of Burden Charges by Departments—Debits.
2. Summary of Burden Charges by Classes of Expense—Credits.
3. Standard Periodical Journal Entry—Debits.

4. Standard Periodical Journal Entry—Credits.
5. Basis of Distribution.
6. Burden Rates.

Summary of Burden Charges by Centers—Debits—This Schedule shows the amount of each element of burden charged to the departments, recapitulates the total of the various Appendices, and shows the resulting total departmental burden, which is in agreement with the amount as shown on the individual Exhibits.

Included in this Schedule are three classes of departments; Productive, Non-Productive, and Re-Distributed departments. The Productive departments are the ones which directly affect the product, and for which burden rates have been developed. The Non-Productive departments are those in which the total expenses are transferred to some one of the selling or administrative expense accounts, and have nothing to do with manufacturing expense. The Re-Distributed departments correspond to the service centers, the expenses of which are closed out to the Productive or Non-Productive departments served.

Summary of Burden Charges by Classes of Expense—Credits. This Schedule shows by classes the accumulation of all of the charges included in the burden and shown on the Appendices and Exhibits.

Standard Periodical Journal Entries—Debits. This Schedule is the standard periodical journal entry which carries the fixed charges to the various burden accounts.

Standard Periodical Journal Entries—Credits. On this Schedule are shown the off-setting credits to the charges made from the above Schedule of debits. These credits are made to the various expense or reserve accounts in the general ledger.

Basis of Distribution. On this Schedule are shown the various bases used and applied to the total annual burden in each productive department to determine a rate to be used in applying the burden.

Burden Rates. This Schedule gives a summary of the burden rates as determined by the development of burden charges.

PART II—SUMMARIZATION METHODS AND PROCEDURE

The second part of this paper is devoted to the costing of our product for accounting purposes and to presenting a method of cost accounting procedure for the purpose of performing the intermediate step of summarization for the journal entries.

The development of mechanical devices for accounting work is one of the most important features of recent progress in the analysis and control of modern industry. There have never before been business conditions demanding such an intimate knowledge of all phases of the operation of a commercial or industrial enterprise as those of today, and the volume of clerical work necessary for compiling and classifying separate data would be tremendous

if it were not for the efficiency rendered by the machinery of the modern office.

Practically every type of transaction can be handled more efficiently, more accurately and more economically by the use of modern accounting devices than by hand. Certain easily recognized factors will point out the need for substituting mechanical adding, computing, and recording devices in the place of the slower and less accurate human employee.

There are certain factors to be taken into account in making a decision regarding the installation of equipment of this kind. It requires considerable investment. This investment must pay returns. These returns must be expressed in terms of economy, accuracy, and efficiency in record keeping. If upon careful analysis, it is found that certain bookkeeping work can be accomplished at sufficiently less cost by the use of mechanical devices than by hand to pay a fair return on the amount invested, the use of such devices is economical.

Some of the distinct advantages which may be gained by the use of mechanical equipment is the elimination of any peak load at the end of the period, because of the fact that all computations and balancing are done at the time of making the posting or entry. Machine written records are always legible, accurate and uniform.

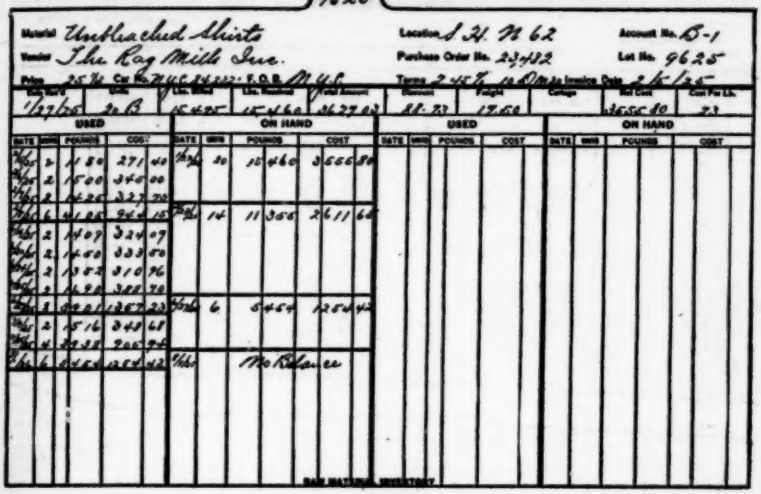
The difference between reliable up-to-date records and fragmentary behind-time guesses at results has often meant the difference between success and failure to both large and small enterprises. The increased administrative efficiency of any organization through complete and up-to-date knowledge of all facts regarding the operation of the business may well bring results and profits that are difficult to estimate and the cost of adequate accounting methods and devices are often insignificant in comparison.

Materials form a very important part of the cost of paper. Our principal materials are: rags, pulp, hides for sizing, chemicals, and colors.

When a purchase invoice for raw materials is received in the cost department, a Raw Material Inventory card (See Exhibit 3) is headed up, giving a description of the material, vendor's name and number, purchase order number, lot number, price, and terms. In addition, pounds billed, total amount, discount, freight and the net cost to the company are also shown.

A Receiving Slip is made out from the purchase invoice. A description of the material, invoice date, car number, and serial lot number assigned to the shipment are recorded at the top. In addition, the unit number given by the vendor (in case of rags, the unit would be a bale, or in the case of a chemical, a drum etc.) is recorded and the corresponding invoice weights listed.

Bale tags are also made out from the purchase invoice. One tag is made out for each bale or container listed on the invoice and bears a shipper number and a consecutive bale or container number


9625

Material Unbleached Shirts — Location S 21 N 62 — Account No. B-1

Vendor The Rag Mills Inc. — Purchase Order No. 23412 — Lot No. 9625

Terms 2 45 E.O.M. — Invoice Date 2-6-26

Date Rec'd	Unit	Lbs. Rec'd	Lbs. Rejected	Cost Amount	Discount	Freight	Cartage	Ref. Cost	Cost Per Lb.
1/27/26	2 B	15425	15460	3627.03	21.73	17.60		3605.30	23

USED				ON HAND				USED				ON HAND			
DATE	MIS	POUNDS	COST	DATE	MIS	POUNDS	COST	DATE	MIS	POUNDS	COST	DATE	MIS	POUNDS	COST
2/6/26	2	1180	271 40	2/6/26	20	15460	3566 80								
2/6/26	2	1500	345 00												
2/6/26	2	1420	327 20												
2/6/26	4	4120	948 15	2/6/26	14	11300	2611 65								
2/6/26	2	1407	324 07												
2/6/26	2	1450	333 50												
2/6/26	2	1352	310 96												
2/6/26	2	1320	303 60												
2/6/26	3	5201	1196 23	2/6/26	6	5454	1254 42								
2/6/26	2	1516	348 68												
2/6/26	4	3038	698 74												
2/6/26	6	4454	1024 42	2/6/26		No Balance									

RAW MATERIAL INVENTORY

EXHIBIT 3

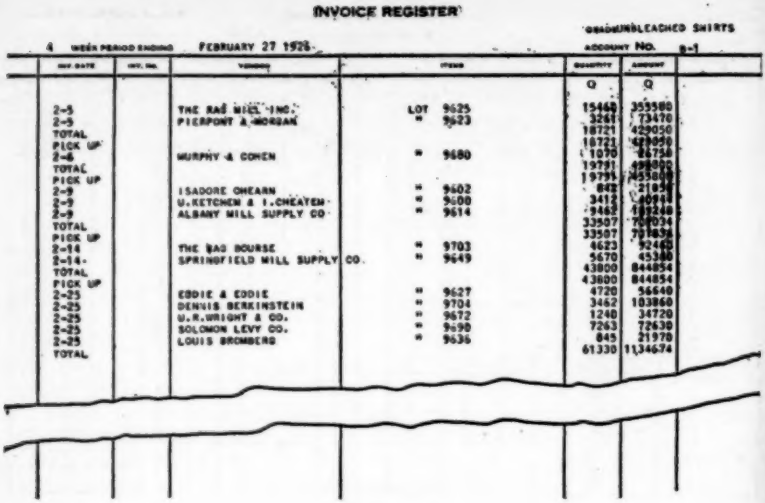
on the main portion of the tag, and also the stub. A serial lot number for each shipment is assigned and recorded on each tag.

A set of bale tags is handed to the receiving clerk along with a Receiving Slip, covering the lot or shipment. When a bale or container is removed from a car, it is weighed. The Receiving Clerk selects a bale tag bearing a bale number, the corresponding invoice weight for which (as recorded on the Receiving Slip) most nearly approximates our weight. He then attaches the tag to the bale or container, recording our weight. The bale or container is then placed in storage or used.

When the Receiving Slip, covering each lot, is returned to the cost department, the date received, description of the material, total units received and a record of our weight opposite each unit number are copied on the back of the Raw Material Inventory card, and the weight totaled.

The net cost divided by the pounds received gives a cost per pound of material received in each lot.

After the purchase invoices are recorded on the Raw Material Inventory cards, they are posted to the Invoice Register sheets for the proper kind or grade of material received. (See Exhibit 4). At the close of the accounting period a recapitulation is made of all Invoice Register sheets for each raw material account. These summary sheets constitute the debits to all inventory accounts for raw materials and are in proof with the debits as shown by the Accounts Payable Register.



INVOICE REGISTER

4 WEEK PERIOD ENDING FEBRUARY 27 1926

UNBLEACHED SHIRTS

ACCOUNT NO. 8-1

INV. DATE	INV. NO.	VENDOR	ITEM	QUANTITY Q	AMOUNT Q
2-5		THE RAG MILL (INC.)	LOT 9625	15468	353580
2-5		PIERPONT & MORGAN	" 9623	3251	73470
TOTAL				18721	429050
PICK UP				18721	429050
2-6		MURPHY & COHEN	" 9680	1070	24750
TOTAL				19791	453800
PICK UP				19791	453800
2-9		ISADORE OHEARN	" 9602	842	21840
2-9		U.KETCHEN & T.CHEATEM	" 9600	3412	80948
2-9		ALBANY MILL SUPPLY CO	" 9614	9462	199248
TOTAL				33507	755836
PICK UP				33507	755836
2-14		THE RAG BOURSE	" 9703	4623	92460
2-14		SPRINGFIELD MILL SUPPLY CO.	" 9649	5670	45360
TOTAL				43800	844654
PICK UP				43800	844654
2-25		EDDIE & EDDIE	" 9627	4720	56640
2-25		DENNIS BERKINSTEIN	" 9704	3462	103860
2-25		U.R.WRIGHT & CO.	" 9672	1240	34720
2-25		SOLOMON LEVY CO.	" 9690	7263	72630
2-25		LOUIS BROMBERG	" 9636	845	21970
TOTAL				61330	1134674

EXHIBIT 4

As bales or containers are opened for use, the bale tags are removed and collected, the date opened, and the mill in which they were used, recorded on the back of the tag, together with the weight of sacking and wire (baled rags only). At the close of the day these tags are forwarded to the Cost department. The total of bales and pounds used in each lot is recorded on the face of the proper Raw Material cards, the weight used being priced at the cost per pound, calculated for the lot, and entered in the section headed "Used" only. At the same time, the date used is recorded opposite the bale or container numbers as shown on the back of the card; thus indicating at any time, the exact identifying numbers of all bales or containers unused in each lot. At the close of the period each lot card is balanced, and the units, pounds, and value on hand, shown.

The lot number, bale number, pounds, value (and tare for baled rags only) of raw materials used each day is recorded on the proper Material Used Register sheets (See Exhibit 5) for each grade or kind of material used. At the close of the period a recapitulation is made of all Material Used Register sheets, for each Raw Material account. These summary sheets constitute the credits to all inventory accounts with raw materials and conversely charges to work in process accounts.

An accounting machine trial balance is then taken of all raw material cards for materials on hand in each raw material inventory account, and reconciled as shown on Exhibit 6.

MATERIAL USED REGISTER

5 WEEK PERIOD ENDING APRIL 3 1926

KIND BLEACHED SHIRTS

ACCOUNT No. B-1

LOWER MILL							UPPER MILL						
DATE	LOT NO.	UNITS	QUANTITY	TARE	AMOUNT	V	DATE	LOT NO.	UNITS	QUANTITY	TARE	AMOUNT	
2-5	9625	2	1180	33	27140		2-1	703	2	1578	42	22637	
2-6	9625	2	1500	33	34500		2-1	767	1	878	21	9902	
2-7	9625	2	1425	28	32775		2-1	626	1	653	20	10043	
2-7	626	2	1345	45	20855		2-2	681	2	2292	69	33028	
2-7	996	25	5190	94	76449		2-3	627	2	1733	42	26567	
2-8	626	2	1383	45	21271		2-3	626	2	1287	42	19794	
2-8	663	1	866	25	13017		TOTAL			8421	236	121971	
2-8	996	19	3770	72	55532		PICK UP			8421	236	121971	
2-9	627	2	1640	69	25141		2-5	619	3	2058	60	32455	
2-9	619	4	2710	99	42737		2-5	626	1	684	20	10520	
2-9	996	16	3225	64	47504		TOTAL			11163	316	164946	
TOTAL			24234	607	396921		PICK UP			11163	316	164946	
PICK UP			24234	607	396921		2-10	619	1	686	22	10818	
2-10	619	2	1376	42	21700		2-10	626	2	1346	34	20701	
2-10	627	4	3599	131	55173		2-10	681	2	2345	86	33791	
TOTAL			29209	780	473794		2-10	996	1	187	3	2755	
PICK UP			29209	780	473794		TOTAL			15727	461	233011	
2-11	619	3	2108	83	33243		PICK UP			15727	461	233011	
2-11	626	1	720	27	11074		2-12	619	1	685	23	10802	
2-11	627	1	785	28	12098		2-12	681	1	890	27	12825	
TOTAL			32822	918	530209		2-12	693	1	1023	30	15294	
PICK UP			32822	918	530209		2-12	996	1	197	3	2902	
2-12	619	9	6138	238	96796		TOTAL			18522	544	274834	
2-12	626	1	653	24	10043		PICK UP			18522	544	274834	
2-12	681	2	2030	86	29252		2-15	693	2	2151	74	32157	
TOTAL			41643	1266	666300		TOTAL			20673	618	306991	

EXHIBIT 5

TRIAL BALANCE

5 WEEK PERIOD ENDING APRIL 3 1926 GRADE BLEACHED SHIRTS ACCOUNT No. B-1

ITEMS	QUANTITY	AMOUNT	ITEMS	QUANTITY	AMOUNT	ITEMS	QUANTITY	AMOUNT
LOT NO.			BALANCE					
698	15386	228267	PREVIOUS PERIOD	360680	5353900			
842	11239	164026	INV. REGISTER	14339	211279			
857	20641	306717	TOTAL	375019	5565179			
767	878	9902	MATERIALS USED					
631	26577	387874	LOWER MILL	98628	1460050			
710	11627	172850	UPPER MILL	23892	346897			
628	18761	266004	TOTAL	252499	3758232			
659	21223	319283						
626	8760	134487						
964	898	11806						
681	20324	292926						
971	10617	157065						
896	636	9223						
619	19707	310797						
693	26663	395473						
627	7757	116979						
859	6749	97662						
965	1044	15832						
703	1578	22637						
927	7235	106744						
996	13333	196461						
663	866	13017						
TOTAL	252499	3758232						

EXHIBIT 6

Sorted Rags. At the close of the period the footings (pounds and amount) appearing on the Material Used Register sheets for baled rags opened are recorded on Sorted Rag Inventory sheets for their respective grades. Earned burden is calculated, using the rates developed in the report on the Development of Burden Charges, and is applied together with rag dressing (direct) labor secured from the Payroll Distribution; this distribution being made by grades of rags.

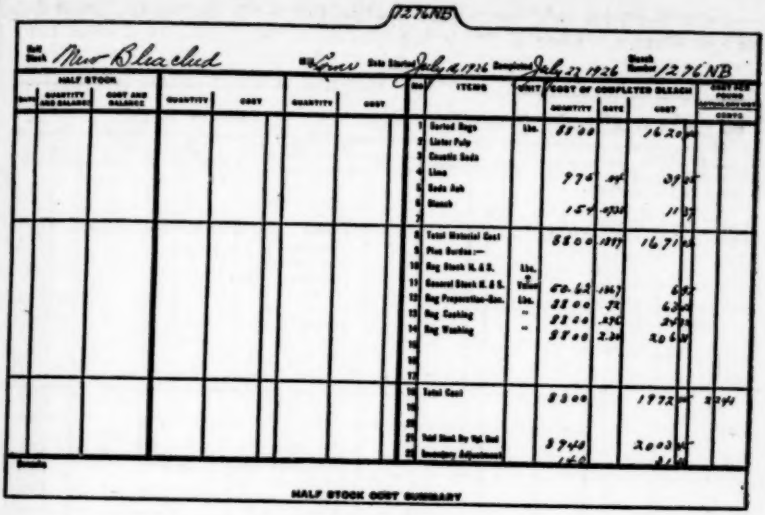
The total cost of baled rags opened, rag dressing labor, and earned burden is added. The net weight of sorted rags is obtained from the recapitulation of Material Used Register sheets, from the column headed Tare; and from a summary of weekly Rag Room Reports of Sorting Out-throws. The sum of these items deducted from the gross weight of baled rags opened, for each grade, gives the net weight of sorted rags. To the net weight of sorted rags, and the total cost of baled rags opened, plus conversion charges, is added the total pounds and value of sorted rags on hand at the close of the previous period.

A standard cost is calculated each period for each grade of rags, this cost being influenced by market conditions. The standard cost is used for calculating the value of all sorted rags in each grade used in bleaches during the period. The total actual cost of sorted rags used is obtained by multiplying the pounds used by the average cost of sorted rags used as indicated on the Sorted Rag inventory. The difference between the total standard cost and the total actual cost of sorted rags used is carried to a price variance account.

Half Stock Cost Summaries. When a report of Sorted Rags Used is received in the Cost Department a Half Stock Cost Summary card is made out, to show the kind of half stock made, on which the total quantity and cost of materials used in the bleach is shown together with the conversion charges, thus giving a total cost of each bleach made. (See Exhibit 7.)

A Register of Half Stock Cost Summaries is used to collect currently the various items entering into the cost of making Half Stock. At the close of the period the totals obtained on the grade sheets are recapitulated and used as a basis for a journal voucher. (See Exhibit 8.)

Stuff Cost Summaries. When the furnish order reaches the Cost department, a Stuff Cost Summary card is made out indicating the kind of furnish made and the total quantity and cost of each item entering into the cost of Stuff. The burden charges are calculated, using the proper operating rate and thus completing the cost of the furnish. The total quantity of rough paper made on each furnish is recorded in the section of the Stuff Cost Summary card, headed Lot Costs. The total cost of the furnish is then pro-rated to the various lots which have been made up from the furnish on the basis of rough paper weight in each lot. The stuff



1276NB

Half Stock: Mist Bleached — Mill: Lower — Date Started: July 2 1926 — Date Finished: July 27 1926 — Stock Number: 1276NB

HALF STOCK						No.	ITEMS	UNIT	COST OF COMPLETED BLEACH			COST PER POUND (DECIMAL EQUIVALENT)
Date	QUANTITY AND BALANCE	COST AND BALANCE	QUANTITY	COST	QUANTITY	COST			QUANTITY	RATE	COST	CENTS
						1	Sorted Rags	Lbs.	8800		162040	
						2	Linter Pulp					
						3	Caustic Soda					
						4	Lime		774	.04	30 96	
						5	Soda Ash					
						6	Bleach		154	.032	11 03	
						7						
						8	Total Material Cost		8800	.1917	1671 84	
						9	Plus Burden:—					
						10	Beg Stock H. & S.	Lbs.				
						11	General Stock H. & S.	Value	60.62	.1067	6 47	
						12	Beg Preparation-Gen.	Lbs.	8800	.72	63 36	
						13	Beg Cooking	"	8800	.252	24 75	
						14	Beg Washing	"	8800	.234	20 68	
						15						
						16						
						17						
						18	Total Cost		8800		1972 04	2241
						19						
						20						
						21	Total Stock Dry Wt. Out		8740		2003 04	
						22	Inventory Adjustment		160		31 20	

Remarks

HALF STOCK COST SUMMARY

EXHIBIT 7

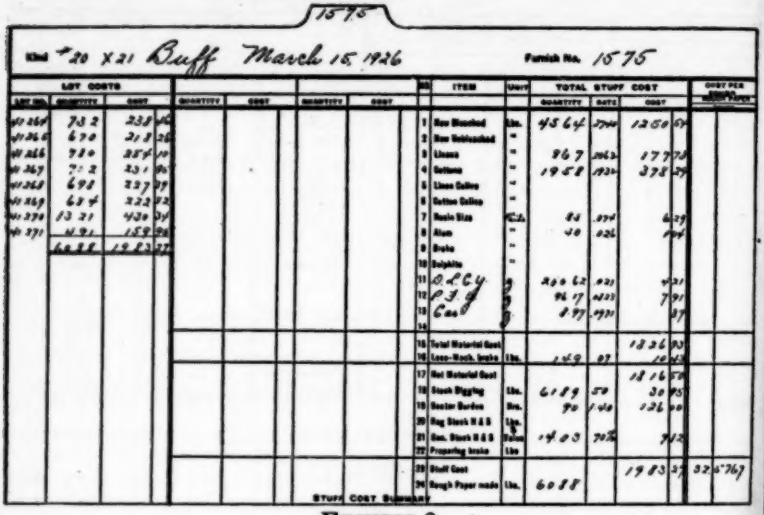
REGISTER OF HALF STOCK COST SUMMARIES

4 WEEK PERIOD Ending FEBRUARY 27 — MILL LOWER — GRADE MIST BLEACHED — ACCOUNT NO. 8-11 — (HALF STOCK No. 1)

BLEACH No.	WEIGHT PER UNIT		CHEMICALS		RAG PREPARATION		RAG COOKING		RAG WASHING		TOTAL COST	✓
	UNITS	LBS.	QUANTITY	$	$ PER UNIT	$	$ PER UNIT	$	$ PER UNIT	$	$	
	0	+	+	+	+	+	2	+	+	+	—	
1276 NB	8800	162040	5062	692	6348		2432		20631		197205	
1277 NB	38080	695080	10940	1560	24564		6060		54067		793311	
1278 NB	25000	584200	7960	1040	19762		7540		48063		668565	
TOTAL	63800	1441240	23062	3312	50674		18032		122761		1659081	
PICK UP	63800	1441240	23062	3312	50674		18032		122761		1659081	
1279 NB	11000	192300	6672	997	14200		2900		23067		240136	
TOTAL	74800	1633540	29734	4309	64874		20932		145828		1899217	
PICK UP	74800	1633540	29734	4309	64874		20932		145828		1899217	
1280 NB	8800	172063	3840	580	6540		2214		20070		205307	
1281 NB	11000	216034	6241	870	14020		2625		22947		262937	
1282 NB	8800	164021	3629	620	6321		2340		17946		196677	
1283 NB	8800	152062	3786	580	6019		2290		19690		181427	
TOTAL	112200	2337720	47230	6959	97774		30601		228481		2746765	
PICK UP	112200	2337720	47230	6959	97774		30601		228481		2746765	
1284 NB	30000	682000	10127	1470	24362		8140		53964		760063	
1285 NB	25000	574263	8260	1162	19645		7221		46270		656821	
TOTAL	167200	3593983	65617	9591	141781		45962		330715		4163649	

EXHIBIT 8

cost for each lot is then posted to the Lot Cost Summary card for Rough Paper. (See Exhibit 9.)



1575

Kind 20 X 21 Buff March 15 1926 Furnish No. 1575

| LOT COSTS | | |

REGISTER OF STUFF COST SUMMARIES

BURDEN CREDITS

WEEK PERIOD ENDING FEBRUARY 27 1926 GRADE NO 35 ACCOUNT NO. B-32

	PURCHASE NO.	HOT WAT. LOFT OR	STOCK BOILING—GO LOWER	STOCK BOILING—GO UPPER	BEATERS—GO LOWER	BEATERS—GO UPPER	RAW STOCK M. A. C.	RAW STOCK M. A. C.	PROP. SHARE OH	TOTAL COST OF
		+	+	+	+	+	+	+	+	=
	1575	181650	3095		12600			982		198327
	1576	523957	4040		56243			230	1026	585496
	1577	671590	5234	1240	65000			320	1256	744642
	1578	341590	3420		40678			126	580	386794
	1579	530032	1126		54321			175	1650	587307
	1580	391964	370	9043		50080	2456	330	1167	464400
	1581	100571	2210		8920		750	90	967	113578
	1582	407613		7890		46044	877	440	1938	464803
	1583	472277		7790		44098	1223	1010	1756	526154
	1584	395484		6650		39076	1009	770	1143	444132
	TOTAL	4016754	19457	32613	237612	185306	6315	4473	11903	4514633

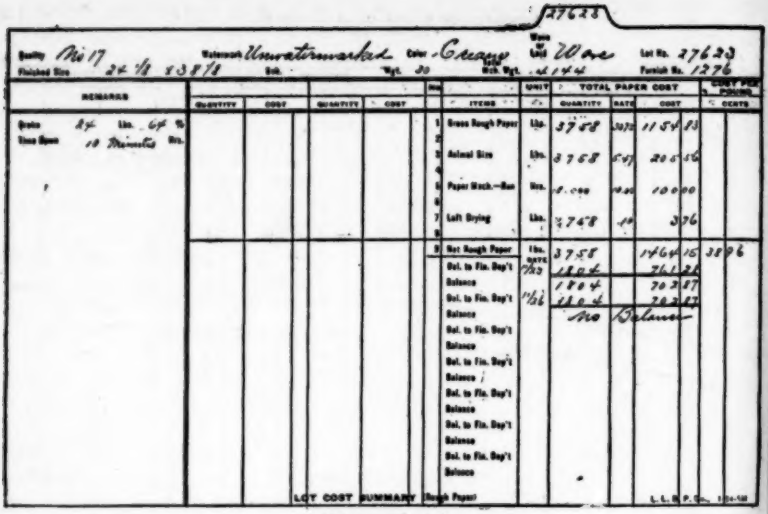
EXHIBIT 10

Lot Cost Summaries—Rough Paper. Rough Paper delivered from the loft or air dryer may be run through the successive finishing operations to completion, without being placed in rough storage, or on the other hand it may be taken to rough paper storage and kept there; being finished from time to time in smaller quantities.

For rough paper made a Lot Cost Summary card (Rough Paper) is made out. A description of the paper processed under each lot number is indicated. The stuff cost as explained, is obtained from the Stuff Summary card. The standard consumption of animal size used in making each lot of paper is calculated, using a rate per 100 pounds of rough paper made. Paper machine, Loft or Air Drying burden is applied and the total cost shown. (See Exhibit 11.)

A Register of Lot Cost Summaries—Rough Paper, is used to collect currently the various items entering into the cost of rough paper. (See Exhibit 12.)

Lot Cost Summaries—Finished Paper. As each lot or sub-lot of rough paper is drawn from storage, a Finishing Order is issued by the Finishing department, bearing a production order number corresponding to the lot number from which the rough paper is drawn. As each order is issued a Lot Cost Summary card—Finished Paper is headed up. The quantity and cost of rough paper are recorded from the Lot Cost Summary card—Rough Paper, covering the rough paper cost of the original lot. The quantity and cost of the first lot issued will be deducted from the quantity and cost of the whole lot, the balances being shown. Similarly, the quantity and cost of each succeeding lot issued will



27628

Quality No 17 Material Unwatermarked Color Cream Wove or Laid Wove Lot No. 27628

Finished Size 24 1/2 x 38 1/2 Sub. Wt. 20 Rich Wt. 41/44 Furnish No. 1276

REMARKS	QUANTITY	COST	QUANTITY	COST	No.	ITEMS	UNIT	TOTAL PAPER COST QUANTITY	RATE	COST	COST PER THOUSAND DOLLARS	CENTS
Grade 24 Lbs. 64 %					1	Gross Rough Paper	Lbs.	3758	3072	1154	88	
Time Spun 10 Minutes Hrs.					2							
					3	Animal Size	Lbs.	3758	541	20	56	
					4							
					5	Paper Mach.—Run	Hrs.	10	10 00	100	00	
					6							
					7	Loft Drying	Lbs.	3758	11	3	96	
					8							
					9	Net Rough Paper	Lbs. WETS DRY	3758		1464	15	3896
						Del. to Fin. Dep't	1/20	1804		702	87	
						Balance		1804		702	87	
						Del. to Fin. Dep't	11/21	1804		702	87	
						Balance		No Balance				
						Del. to Fin. Dep't						
						Balance						
						Del. to Fin. Dep't						
						Balance						
						Del. to Fin. Dep't						
						Balance						
						Del. to Fin. Dep't						
						Balance						

LOT COST SUMMARY Rough Paper

L. L. & P. Co. 124-10

EXHIBIT 11

REGISTER OF LOT COST SUMMARIES
ROUGH PAPER

GRADE NO 17

ACCOUNT No. 8-32

4 WEEK PERIOD ENDING FEB 27 1924

LOT No.	WEIGHT FURNISH	STUFF COST	ANIMAL SIZE	PAPER MACHINE No. 1 WEIGHT	PAPER MACHINE No. 1 AMOUNT	PAPER MACHINE No. 2 WEIGHT	PAPER MACHINE No. 2 AMOUNT	PAPER MACHINE No. 4 WEIGHT	PAPER MACHINE No. 4 AMOUNT	LOFT DRYING	AIR DRYING	TOTAL COST
	0	+	+	0	+	0	+	0	+	+	+	=
27623	3758	115483	20356			10000	10000			376		146415
26598	6478	235890	35665			22550	39601			1898		313254
17689	2254	19987	1458	12500	16987					2290		40730
17599	5186	217895	50565	33333	56823					9822		335105
4328	9826	563496	1998					15750	29835		1556	596879
2436	689	18725	1156			34667	24378			11983		56242
1452	3334	28765	8765	2833	14537					1444		53511
4537	367	9875	7756					9917	56872		45624	120128
4324	1785	9987	1487					2417	63478		7642	82594
1997	245	99178	15628	25500	19982					2658		137446
2548	1764	6378	1222			2541	2552			998		11150
TOTAL	35686	1325653	146256	74166	108329	69758	76731	28084	150186	31477	54822	1893454

EXHIBIT 12

be deducted from the previous balances of quantity and cost and a new balance shown.

Thus the cards for lots of rough paper in storage show at all times the quantity and cost of rough paper actually in stock.

Lot Cost Summary cards for lots put through the finishing operations, to completion, gather the total direct labor and burden charges and also show the quantities of broke made besides the various sortings. These quantities and costs are then carried to the Finished Stocks Ledger cards maintained for each grade of finished paper.

A Register of Lot Cost Summaries, for finishing paper, is used to collect currently the various items entering into the cost of finishing paper. At the end of the period the totals thus obtained are used as a basis for a journal voucher.

Cost of Sales—Normal Basis. A Cost of Sales Register sheet is headed up each period for each grade of paper carried in stock. The quantity, items and invoiced weight of each shipment are recorded currently. At the close of the period, a recapitulation is made of the various grades, and priced, using an average price per pound as shown on the Finished Stock Ledger cards for each grade of paper sold. This recapitulation is used as a basis for a journal voucher. (See Exhibit 13.)

The entire intermediate step of summarization is accomplished by means of an accounting machine. All sheets are made to conform with the requirements of this device, thus standardizing all working papers and providing a uniformity that heretofore has been lacking.

COST OF SALES REGISTER

PERIOD ENDING JAN 30 1926 GRADE NO 17 ACCOUNT No. B-34

DATE INVOICED	CASE NUMBER	QUANTITY REAMS	QUANTITY SHEETS	SIZE	SUBSTANCE	WEIGHT PER REAM	CUT-UP	INVOICED POUNDS	INVOICED AMOUNT	V
1-2	3321	6		23-36	26	80		480	6600	
	3435	1		21-32	32	57		57		
		1		21-32	32	57		57		
		1		23-36	36	80	8	20	1452	
	3486	5		24-38	36	88		440	99763	
	3482		140	23-36	36	80		22	105	
							8	1136	107920	
TOTAL								40		
1-3	3503	1		18-23	36	40		65		
		1		21-32	36	65		21	11912	
		1		14-17	32	20	5	56		
	3488	2		17-22	28	28		57		
		1		21-32	32	57		176	55699	
		2		24-38	36	88		120		
	3478	5		17-22	24	24		140	345	
		5		17-22	28	28		497	89875	
	3431	7		23-36	32	71		40	8777	
	3479	1		18-23	36	40	4	244	4597	
	3487	3		24-38	36	88		544		
	3490	16		19-24	28	34		486		
	3491	12		17-28	32	40	5	497	109815	
	3492	7		23-36	32	71		3003	281020	
TOTAL							4	1136	107920	
PREV TOTAL							8	4139	388940	
TOTAL TODAY							4			
TOTAL TO DATE							12			

EXHIBIT 13

The machine performs this step most effectively, with gratifying neatness, absolute accuracy and with a very substantial saving of both time and expense.

Accuracy is a very vital factor especially in cost accounting and the accounting machine has been provided with every possible safeguard against misoperation. In fact, it is more than human in many respects. If the operator fails to properly clear the machine it automatically locks all the adding keys and thus compels correction of the error before the operator can proceed with her work.

Last but not least is the fact that all totals, balances and proofs must be secured in the simple act of writing the entry, because every time the figures must be rewritten the possibility of errors is correspondingly increased.